

A Single Picture Is Worth a Thousand Words: The Effects of Images on Online Learning Content

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ABSTRACT

Visual elements play an important role in the teaching and learning process. Images can help our students to visualize objects, concepts, ideas, and relationships; an image can be a good substitute for mere words. Human beings generally process graphics quicker than text. Usually people are easily drawn by graphics, especially when they are looking at computer screens. If appropriate images can be found to replace or at least supplement the teachers' text context, then the learning efficiency of students can be greatly enhanced.

More and more teachers nowadays agree that adding images to the teaching context is essential. However, some of them lack the conceptual understanding or necessary guidelines in an educational perspective for embedding images into their teaching context, resulting in hindrances of smooth and effective teaching and learning.

*Imagery can be used with all media. However, it must be emphasized that pictorial embellishments alone will not facilitate learning.
(Leshin et al, 1992, p281)*

This paper aims to discuss the various roles of images play in the process of teaching and learning and to demonstrate how visual elements could be added to enhance the context. The writer includes examples extracted from the online courses jointly developed by the Center for Enhanced Learning and Teaching and instructors in HKUST for analysis of the effectiveness of employing images in learning content, especially for online dissemination.

INTRODUCTION

There is a common saying: "A single picture is worth a thousand words". It is not difficult to find different forms and formats of visual elements when you look around. As a matter of fact, image is one of the first non-verbal mean of communication for human beings. Ever since the Stone Age and before any alphabets were invented, humans have been carving and drawing on rocks. Languages such as Chinese are actually evolved from drawings and shapes of real-life objects. It is not difficult to

imagine that, in many cases, a simple drawing or diagram is better than a lengthy text of description. In addition to assistance in conveying messages, the proper use of images can also add a new perspective to what text is describing. In education, the proper use of images can dramatically strengthen the effectiveness and efficiency of teaching and learning.

WHAT IS AN IMAGE?

The term “image” is very generic, and a term of which different parties have different interpretations. Generally speaking, an image is the representation of the external form of a person, an object, or an idea. It exists in various forms and mediums such as a photograph in a magazine, a chart in a newspaper, a logo on a banner, a road sign on the street, wallpaper on the computer screen, and so on. This paper will focus specifically on digital images produced or processed by computer and displayed on a screen.

Digital Image

Digital images can be further classified, in terms of their functions and purposes, into four groups: pictorial, schematic, symbolic, and figural graphics. Pictorial graphics are images that show actual things, for example, photographs, drawings, sketches, and paintings. Schematics are images that link up components or related parts. Concept maps, wiring diagrams, and flow charts are typical schematics. Images that represent messages, give direction, or help navigation are referred to as symbolic graphics. Common symbolic examples are logos and trademarks. Figural graphics are images that represent ideas rather than physical objects. Charts and graphs are typical examples of figural images (Bullough, 1988).

In brief, these possibilities help us to convey ideas, present information, relate components, draw attention, and affect attitudes. Below we will investigate in what particular ways these images might facilitate learning.

IMAGES AND STUDENTS' LEARNING

Many controlled studies support the theory that pictures are more easily remembered than words (Gagné, 1987). People are easily drawn by graphics, especially when they are looking at computer screens. If appropriate images could be found to replace or at least supplement teachers' text context, then a student's learning efficiency could be greatly enhanced. It is obvious that visual elements play an extremely important role in the teaching and learning process.

*The combination of text and graphics increases recall, both simple and complex skills, and helps learners to retain knowledge.
(Fenrich, 1997)*

Different images can be used to achieve different instructional objectives. Here the writer will try to elaborate on the three learning domains originated by Benjamin Bloom, a famous educational psychologist of the 1950s.

Cognitive domain: Images help students to gain knowledge.

The cognitive domain involves knowledge-based content, of which the information is usually abstracted, theoretical, and complex. When we want to convey a precise message, simple diagrams that outline important components or processes are, in some cases, better than a long piece of description. Schematic graphics, for example, concept maps, charts and graphs may be used to present information in an organized way, which help students to digest content easily. Pictorial graphics, such as photographs and drawings, can help students visualize actual objects.

Psychomotor domain: Images help students to perform skills.

The psychomotor domain involves skill-based knowledge and usually requires students to perform certain tasks in order to comprehend particular physical skills. The learning content may need to illustrate procedures and require students to follow them closely. Images such as flow diagrams can help to present information logically and systematically. They also guide students to mirror the steps easily.

Affective domain: Images help students to associate attitudes and feelings.

The content of the affective domain aims to address students' emotions towards the learning experience. Usually, learning content requires students to identify, select, and act on their currently held values or beliefs and to motivate them to think, reflect, and discuss moral issues. The level of attitudes, interest, attention, and awareness could be affected by incorporating pictorial graphics such as photographs, in particular, in the content.

EMPLOYING IMAGES IN LEARNING CONTENTS

The following examples, extracted from the online course co-developed by CELT with instructors from HKUST, demonstrate the diversiform roles of the image with respect to the different learning domains discussed above.

Figure A is captured from a page of an entry-level computer course. The context is to introduce “defragmenter” and its defragmentation purpose. Usually, abstract concepts or phenomena could not be easily explained solely in text. The diagram is added to explain the abstract term “defragmenter” and the concept of “defragmentation” and to help students to visualize the process.

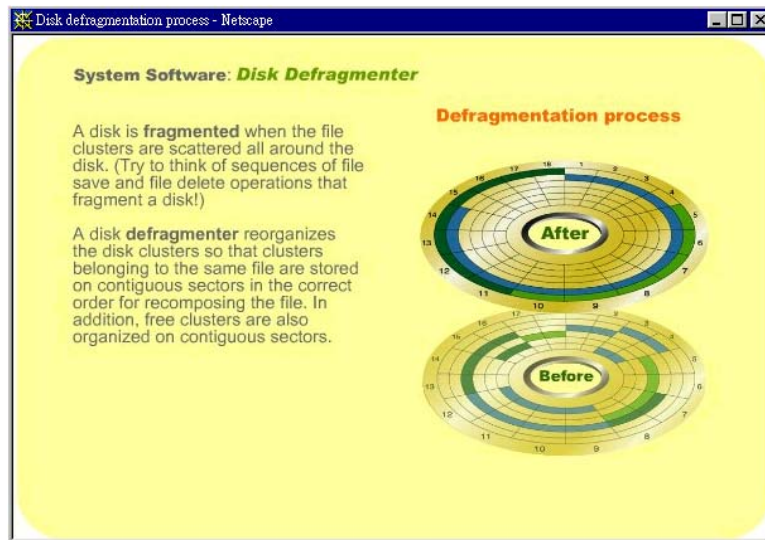


Figure A

Concept module from a computer science course delivered online:
COMP101 Computing Fundamentals

Figure B is captured from a lecture presentation of a civil engineering course. This slide demonstrates the chemical change in the process of cement hydration. A combination of various shapes, lines and patterns is used to help student to understand the complex process.

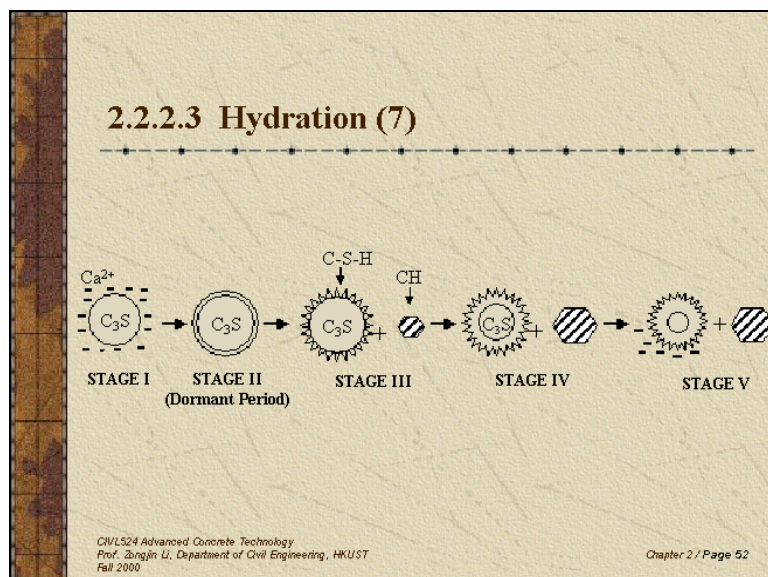


Figure B

Lecture slide from a Civil Engineering course:
CIVL524 Advanced Concrete Technology

Figure C is captured from the same course. Charts and graphs are commonly used for presenting statistical information. Students can quickly conclude from such figurial graphics that Portland cement is the major type of concrete used in construction.

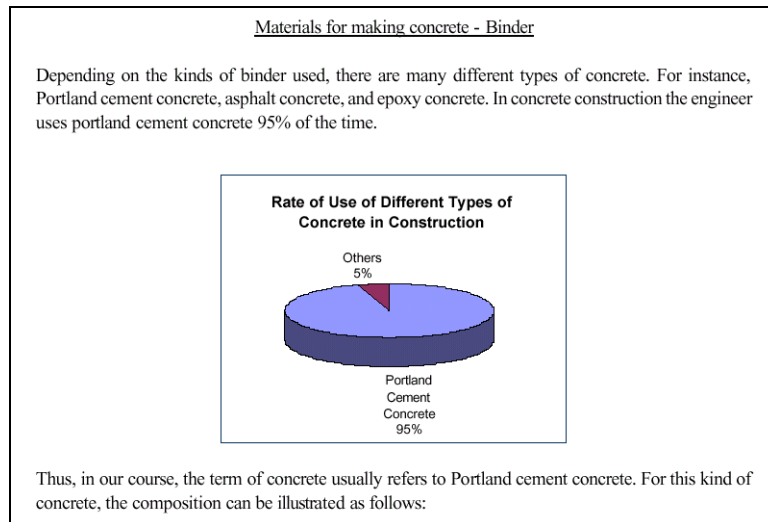


Figure C
Handout from a civil engineering course:
CIVL524 Advanced Concrete Technology

Figure D is captured from the same course. The context is about different forms and types of admixture for making concrete. Whenever possible, it is very helpful to let students visualize real objects by showing them photographs or images rather than explaining with textual description.

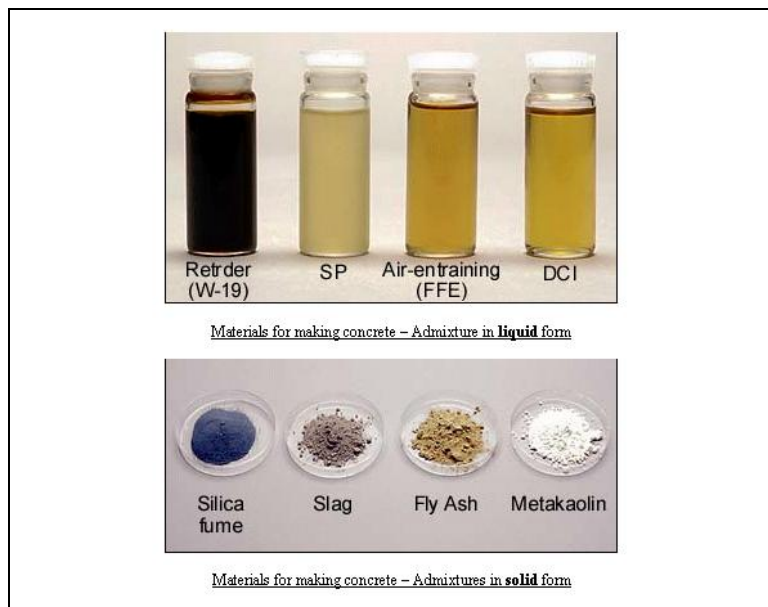


Figure D

Handout from a civil engineering course:
CIVL524 Advanced Concrete Technology

Figure E is captured from a presentation in one of the Instructional Development DIY workshops. The context is to introduce the different learning domains. Three simple pieces of clipart are used to help participants associate the terms and their meaning. The image in this case acts as a mnemonic.

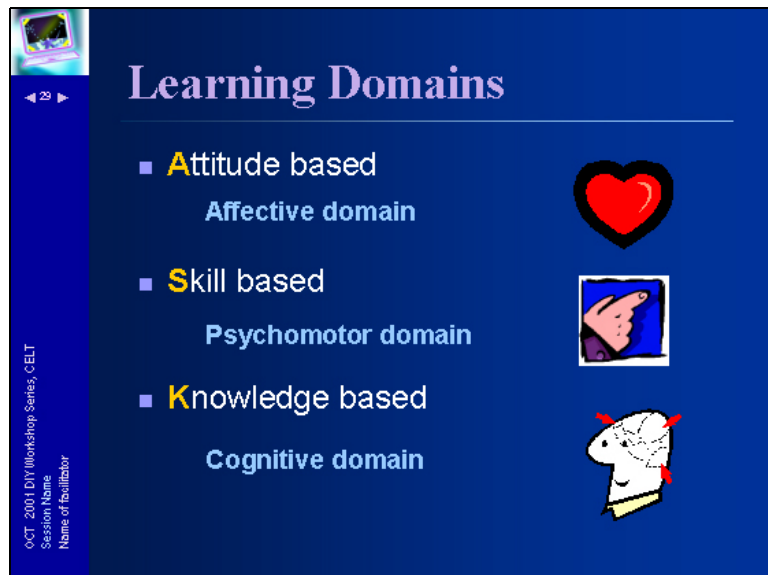


Figure E

Slide from ID DIY 2001 Oct series:

“How to enhance my course through technology?” – the PLAN session

In addition to the above-mentioned instructional purposes, images are also used to direct students during online learning. People get tired and lost more easily when they are reading information on screen. Directional and navigational images, such as icons and buttons, can keep them on the right track. Good use of colors, shapes and lines can also help to draw attention, enhance the look and feel of the materials, and maintain interest in the particular content. In some cases, irrelevant visual art does not help students, but it may have the positive effect of lightening the tone of the materials.

Figure F is captured from a page of a Cantonese online course. Various visual elements are included. A banner design with the course title is located at the top of the page. Its purpose is to identify the course. Navigation buttons are located right below the banner, helping students traverse the pages. In normal practice, navigational graphics usually adopt universal or stereotyped designs, i.e., pointing left or top means going back to the previous page, or vice versa. In the online environment, we usually try to minimize the deliverable, to avoid information overload. The speaker and book-like graphics below are actually buttons that lead to the second-level content.



Figure F
Content page of a language course:
CANTalk

CONCLUSION

In education, the proper use of images can dramatically strengthen the effectiveness and efficiency of teaching and learning. All in all, the good use of images can achieve following goals:

- Help teachers to convey abstract ideas and concepts
- Help teachers to present and deliver teaching content
- Help students to visualize complex processes
- Help students to recall information
- Attract student attention
- Substitute lengthy text description
- Enhance a pleasant learning environment
- Stimulate learning interest

Adding digital images to learning content and delivering course content in the online environment give teachers more alternatives in planning, designing and implementing their instructional strategies. However, image editing and graphic-creating technologies are merely sets of tools. The context of learning is the core and should always have top priority. Hence, to ensure effective utilization of the instructional benefits provided by images and to avoid creating adverse effects, teachers should start with clear objectives and understand the possibilities and constraints of the tools of imagery in the teaching and learning process, especially as regards content whose visual elements play a very important instructional role.

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